FIG. 1

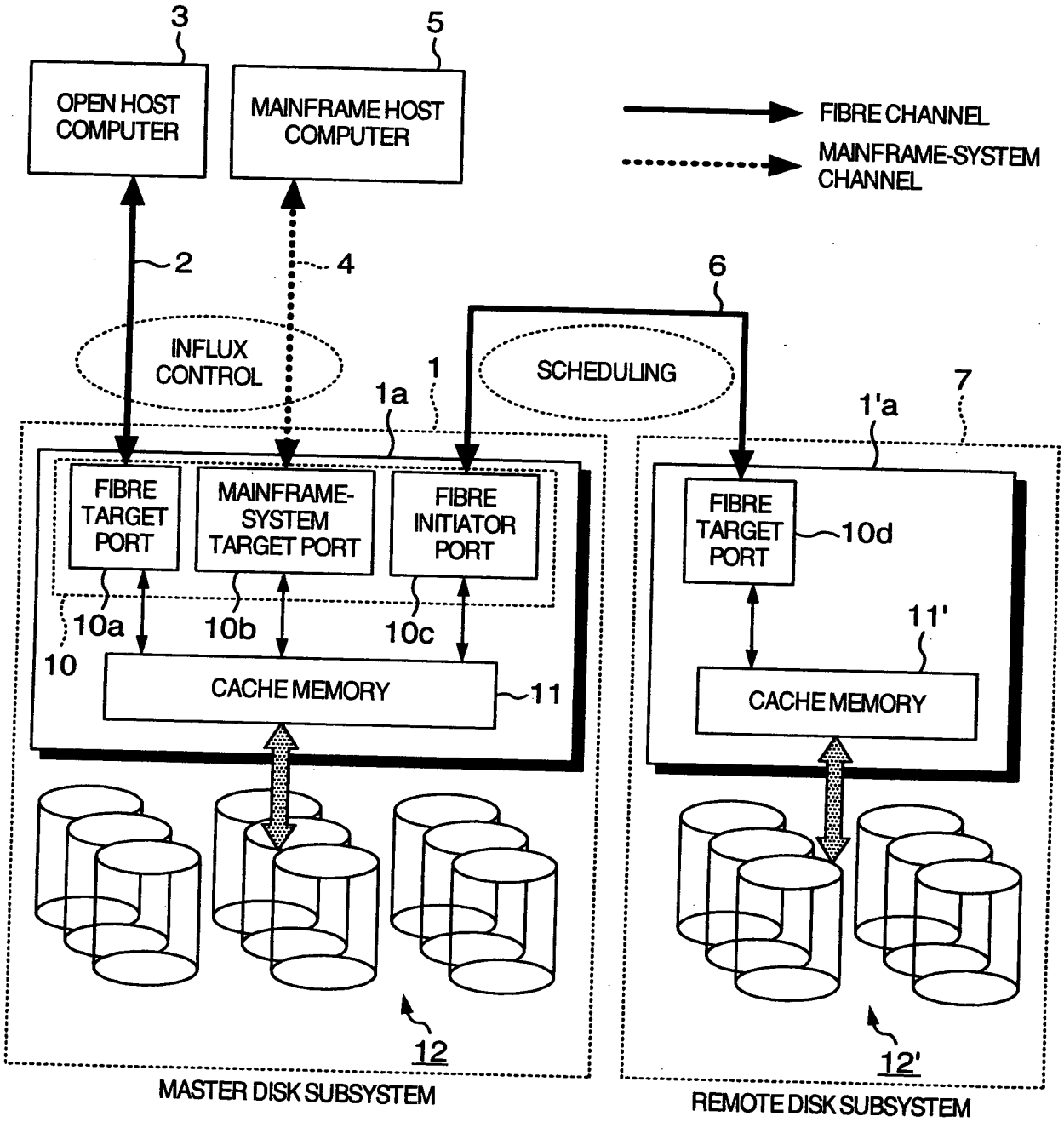

3
5
OPEN HOST COMPUTER
MAINFRAME HOST COMPUTER
FIBRE CHANNEL
MAINFRAME-SYSTEM CHANNEL
2
4
6
INFLUX CONTROL
SCHEDULING
1
1a
7
1'a
FIBRE TARGET PORT
MAINFRAME-SYSTEM TARGET PORT
FIBRE INITIATOR PORT
10a
10b
10c
10
CACHE MEMORY
11
FIBRE TARGET PORT
10d
11'
CACHE MEMORY
12
12'
MASTER DISK SUBSYSTEM
REMOTE DISK SUBSYSTEM

FIG. 2

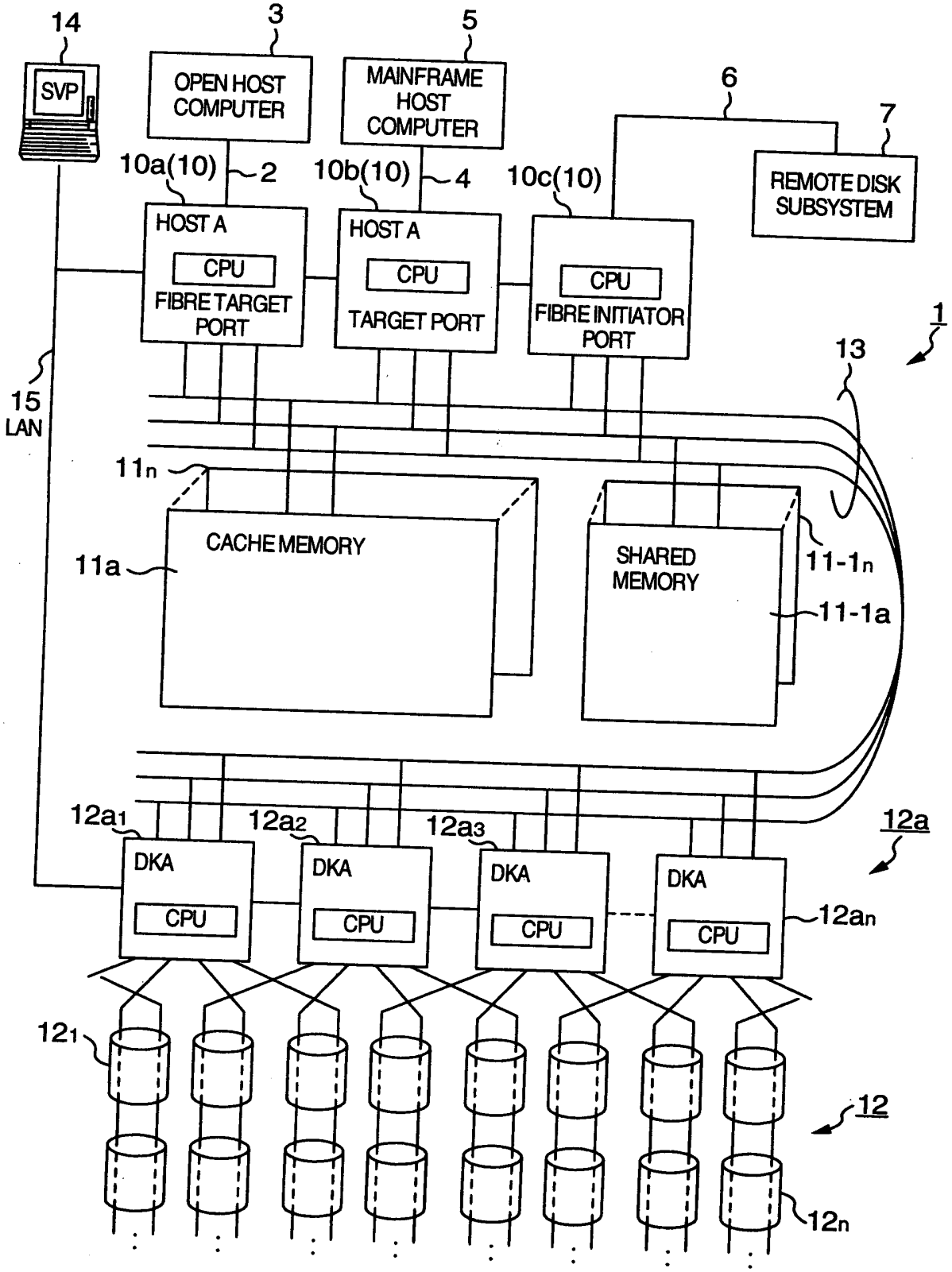

14
SVP
3
OPEN HOST COMPUTER
5
MAINFRAME HOST COMPUTER
6
7
REMOTE DISK SUBSYSTEM
10a(10)
2
10b(10)
4
10c(10)
HOST A
CPU
FIBRE TARGET PORT
HOST A
CPU
TARGET PORT
CPU
FIBRE INITIATOR PORT
1
13
15
LAN
11n
CACHE MEMORY
11a
SHARED MEMORY
11-1n
11-1a
12a1
12a2
12a3
12a
DKA
CPU
12an
121
12
12n

FIG. 3

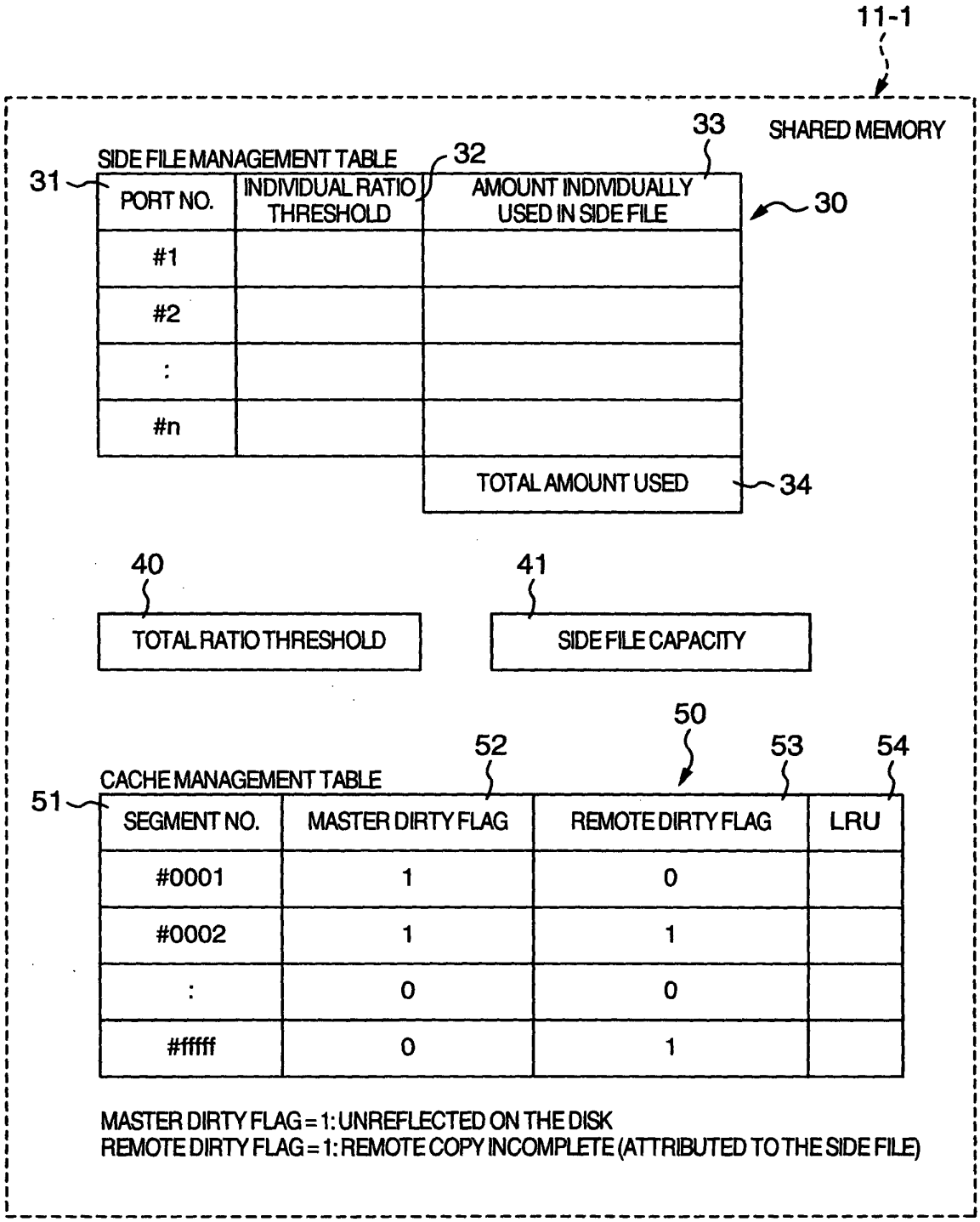

11-1
SHARED MEMORY
33
SIDE FILE MANAGEMENT TABLE
32
31
PORT NO.
INDIVIDUAL RATIO THRESHOLD
AMOUNT INDIVIDUALLY USED IN SIDE FILE
30
#1
#2
:
#n
TOTAL AMOUNT USED
34
40
41
TOTAL RATIO THRESHOLD
SIDE FILE CAPACITY
50
52
53
54
CACHE MANAGEMENT TABLE
51
SEGMENT NO.
MASTER DIRTY FLAG
REMOTE DIRTY FLAG
LRU
#0001
1
0
#0002
1
1
:
0
0
#fffff
0
1
MASTER DIRTY FLAG = 1: UNREFLECTED ON THE DISK
REMOTE DIRTY FLAG = 1: REMOTE COPY INCOMPLETE (ATTRIBUTED TO THE SIDE FILE)

FIG. 4

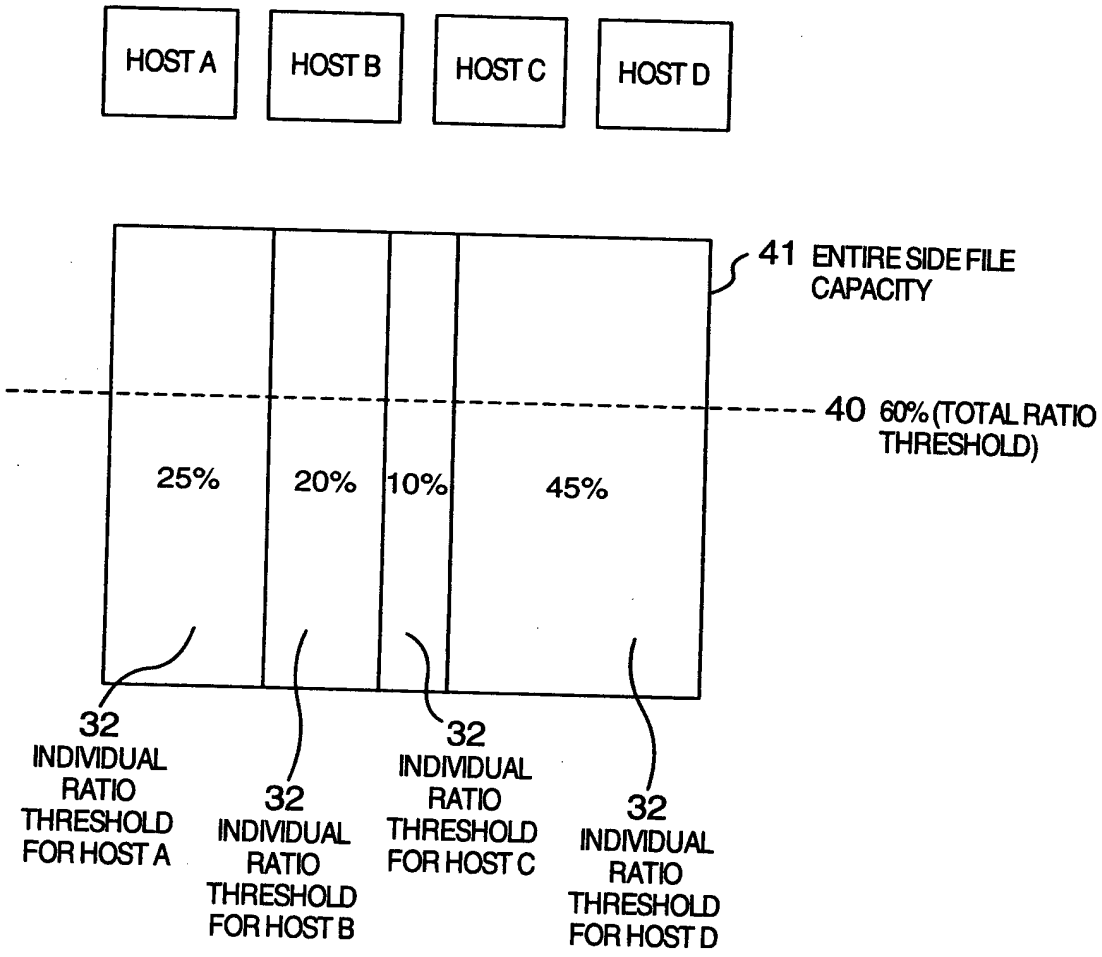

HOST A
HOST B
HOST C
HOST D
41 ENTIRE SIDE FILE CAPACITY
40 60% (TOTAL RATIO THRESHOLD)
25%
20%
10%
45%
32 INDIVIDUAL RATIO THRESHOLD FOR HOST A
32 INDIVIDUAL RATIO THRESHOLD FOR HOST B
32 INDIVIDUAL RATIO THRESHOLD FOR HOST C
32 INDIVIDUAL RATIO THRESHOLD FOR HOST D

FIG. 5

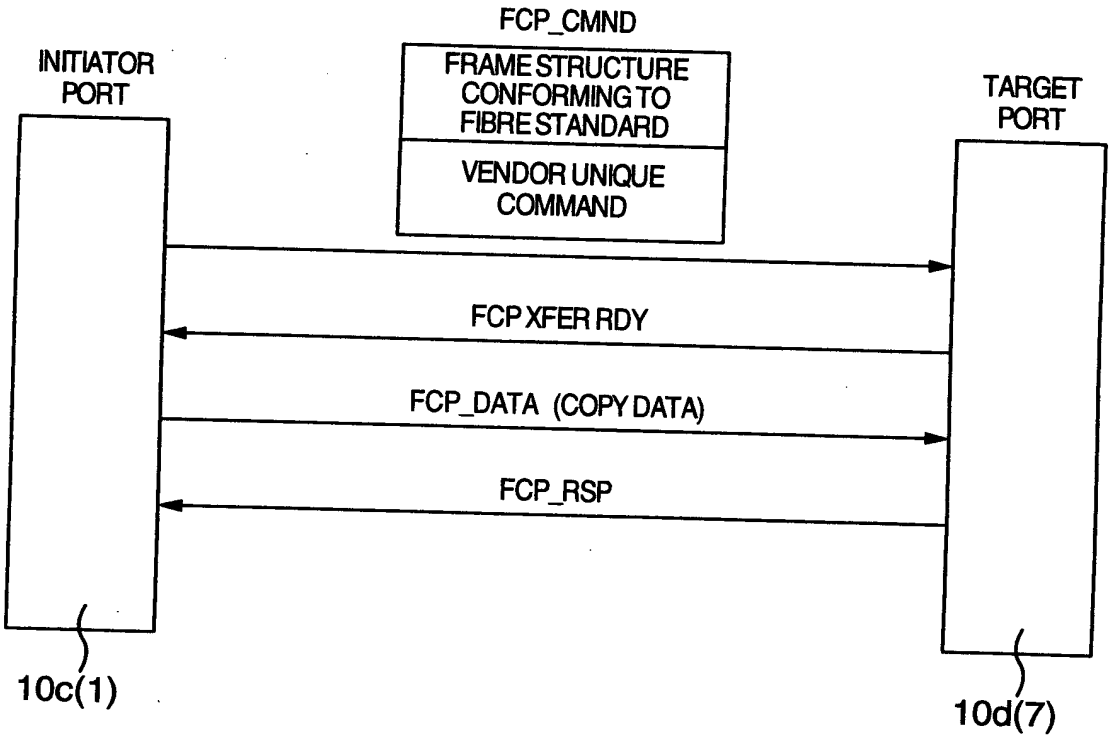

FCP_CMND
FRAME STRUCTURE CONFORMING TO FIBRE STANDARD
VENDOR UNIQUE COMMAND
INITIATOR PORT
TARGET PORT
FCP XFER RDY
FCP_DATA (COPY DATA)
FCP_RSP
10c(1)
10d(7)

FIG. 6

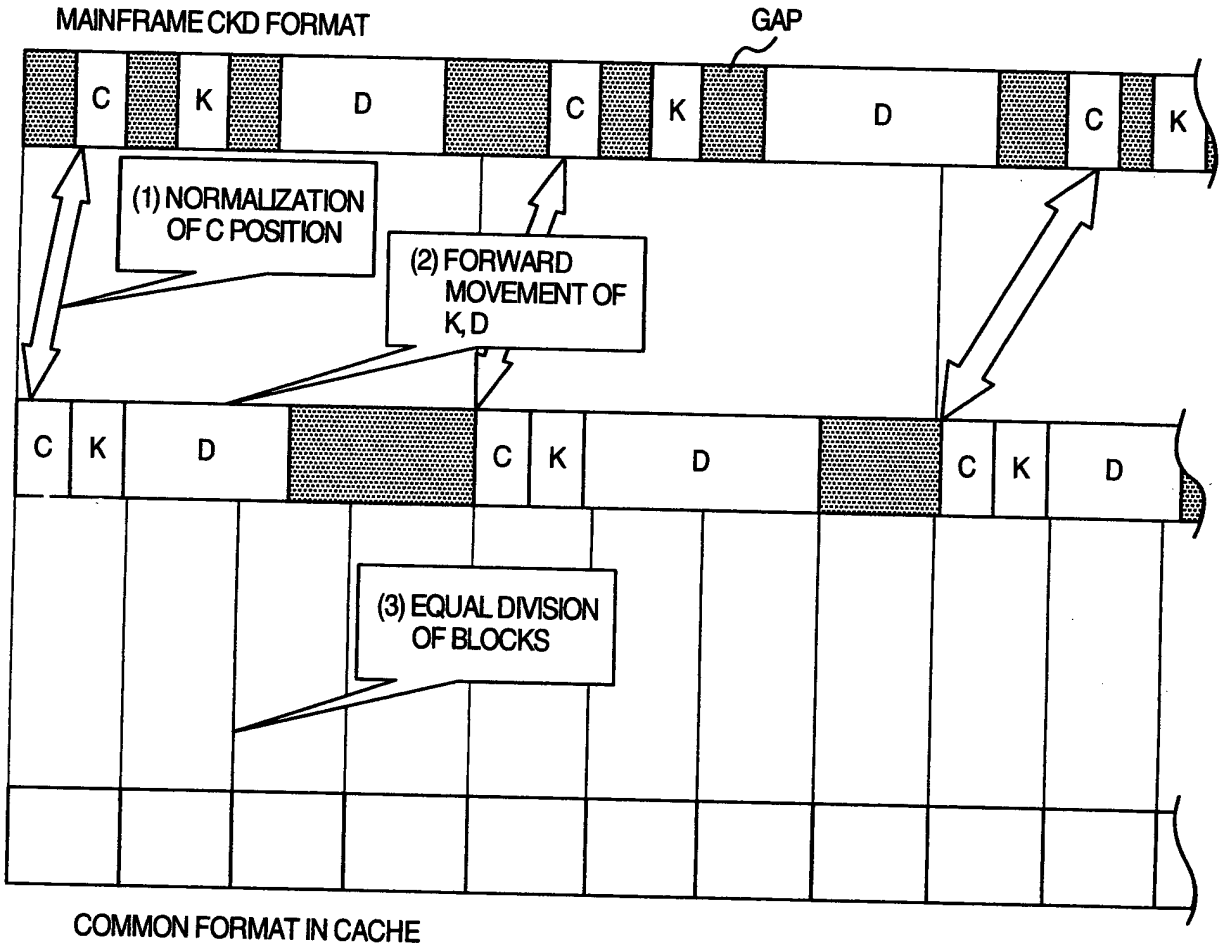

MAINFRAME CKD FORMAT
GAP
C
K
D
C
K
D
C
K
(1) NORMALIZATION OF C POSITION
(2) FORWARD MOVEMENT OF K, D
C
K
D
C
K
D
C
K
D
(3) EQUAL DIVISION OF BLOCKS
COMMON FORMAT IN CACHE

FIG. 7

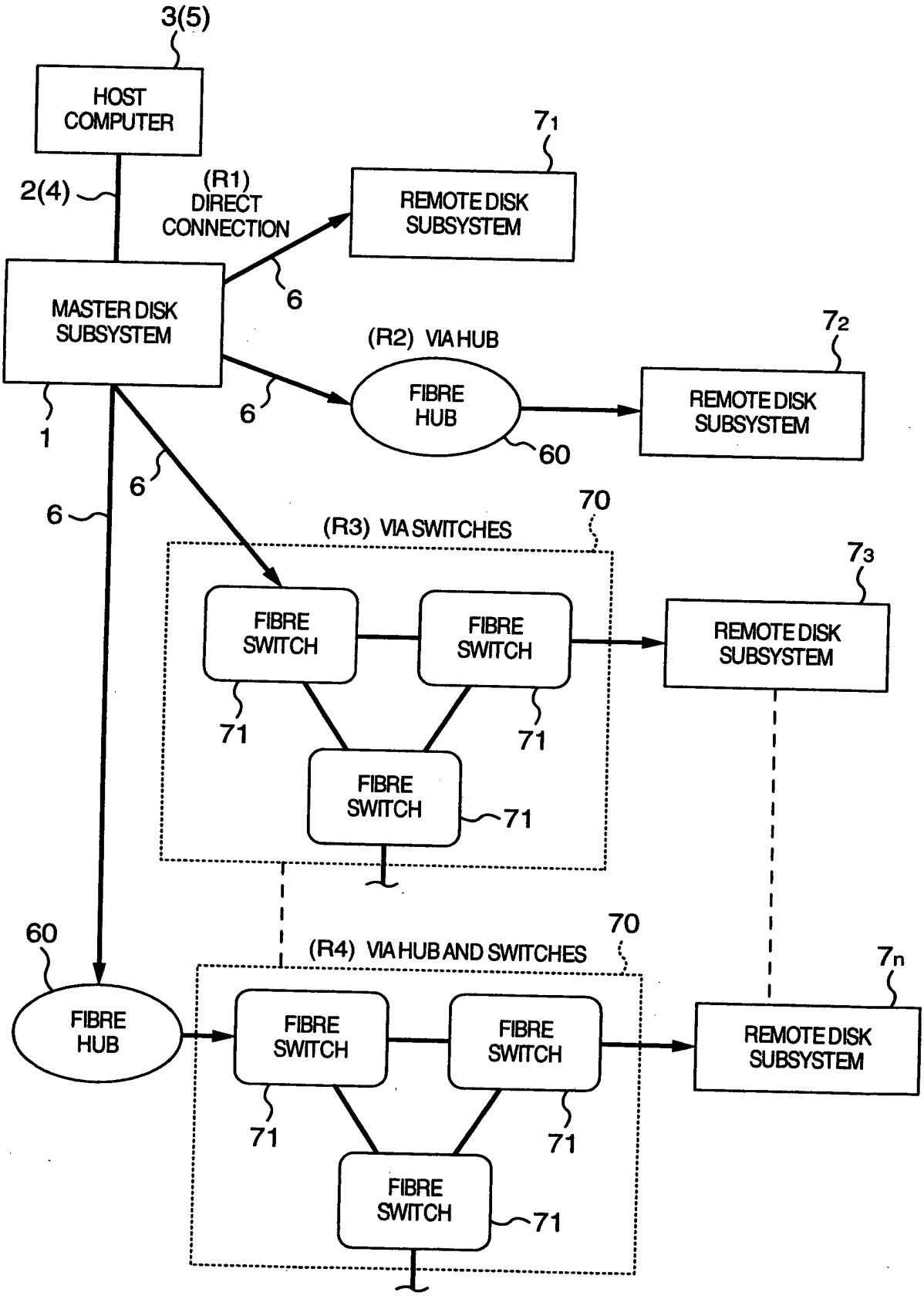

3(5)
HOST COMPUTER
2(4)
(R1) DIRECT CONNECTION
7₁
REMOTE DISK SUBSYSTEM
6
MASTER DISK SUBSYSTEM
1
(R2) VIA HUB
FIBRE HUB
60
7₂
REMOTE DISK SUBSYSTEM
6
6
6
70
(R3) VIA SWITCHES
FIBRE SWITCH
FIBRE SWITCH
FIBRE SWITCH
71
71
71
7₃
REMOTE DISK SUBSYSTEM
60
70
(R4) VIA HUB AND SWITCHES
FIBRE HUB
FIBRE SWITCH
FIBRE SWITCH
FIBRE SWITCH
71
71
71
7n
REMOTE DISK SUBSYSTEM

FIG. 8

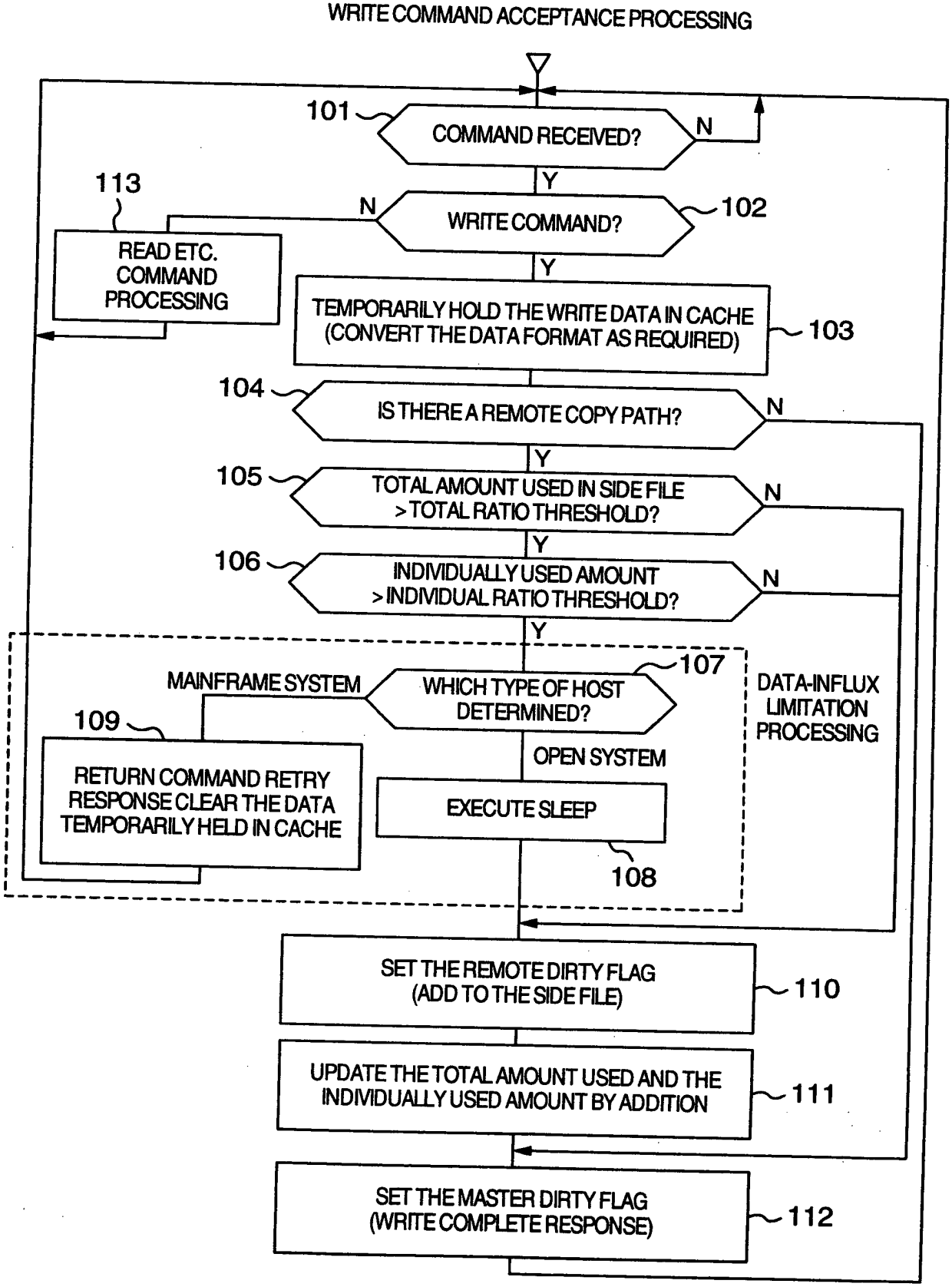

WRITE COMMAND ACCEPTANCE PROCESSING
101
COMMAND RECEIVED?
N
Y
113
N
WRITE COMMAND?
102
READ ETC. COMMAND PROCESSING
Y
TEMPORARILY HOLD THE WRITE DATA IN CACHE (CONVERT THE DATA FORMAT AS REQUIRED)
103
104
IS THERE A REMOTE COPY PATH?
N
Y
105
TOTAL AMOUNT USED IN SIDE FILE > TOTAL RATIO THRESHOLD?
N
Y
106
INDIVIDUALLY USED AMOUNT > INDIVIDUAL RATIO THRESHOLD?
N
Y
107
MAINFRAME SYSTEM
WHICH TYPE OF HOST DETERMINED?
DATA-INFLUX LIMITATION PROCESSING
109
OPEN SYSTEM
RETURN COMMAND RETRY RESPONSE CLEAR THE DATA TEMPORARILY HELD IN CACHE
EXECUTE SLEEP
108
SET THE REMOTE DIRTY FLAG (ADD TO THE SIDE FILE)
110
UPDATE THE TOTAL AMOUNT USED AND THE INDIVIDUALLY USED AMOUNT BY ADDITION
111
SET THE MASTER DIRTY FLAG (WRITE COMPLETE RESPONSE)
112

FIG. 9

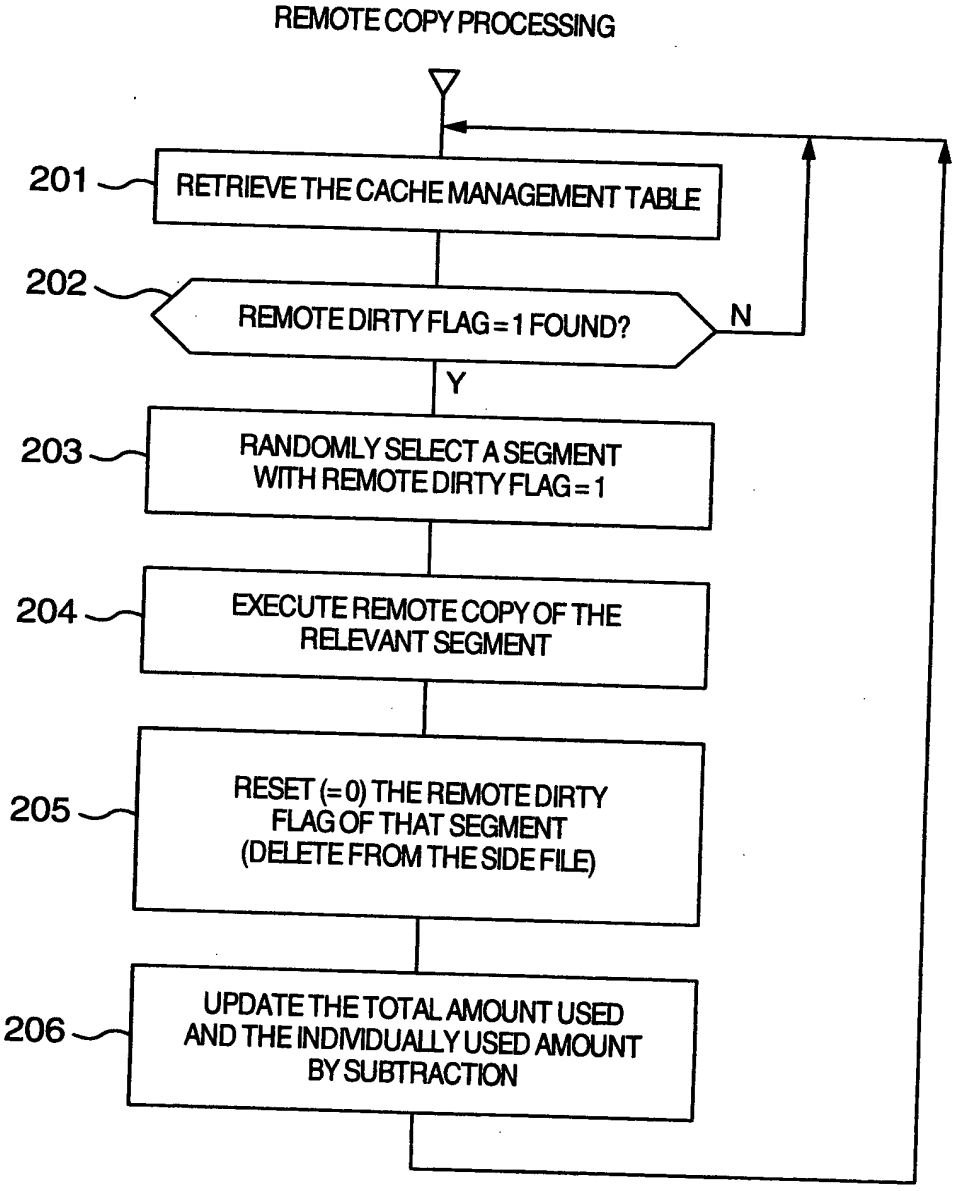
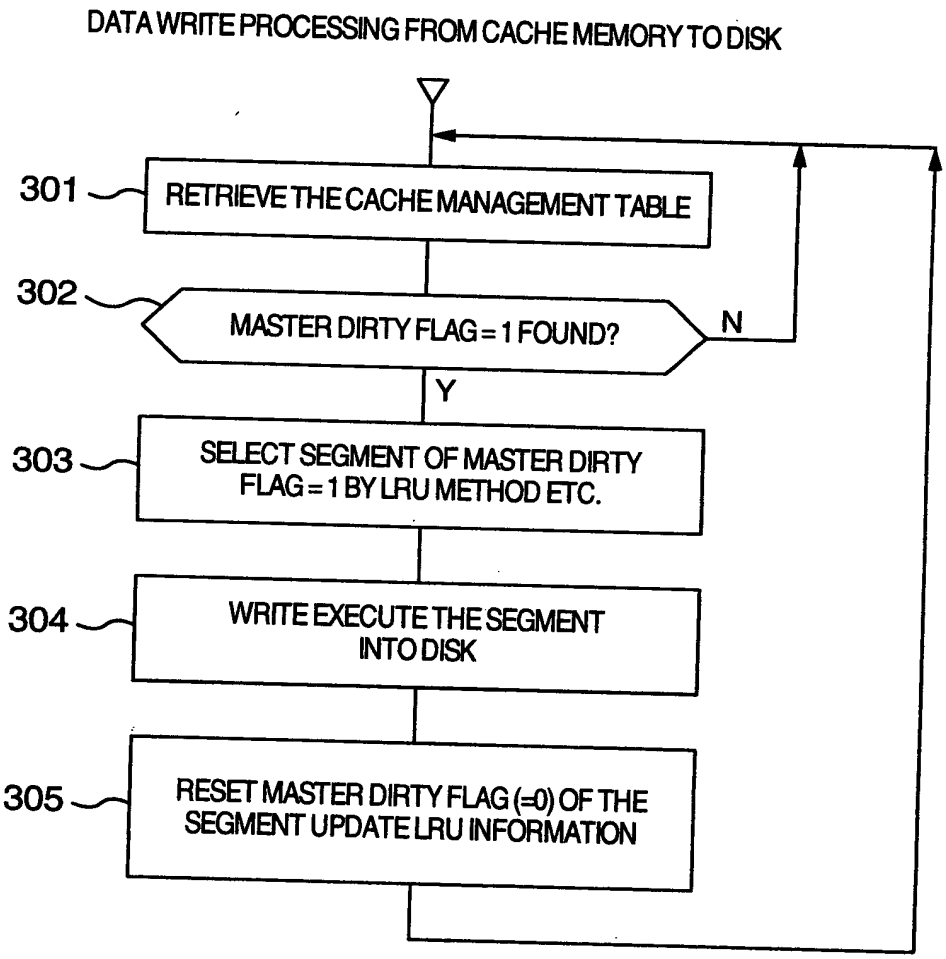

REMOTE COPY PROCESSING
201
RETRIEVE THE CACHE MANAGEMENT TABLE
202
REMOTE DIRTY FLAG = 1 FOUND?
N
Y
203
RANDOMLY SELECT A SEGMENT WITH REMOTE DIRTY FLAG = 1
204
EXECUTE REMOTE COPY OF THE RELEVANT SEGMENT
205
RESET (= 0) THE REMOTE DIRTY FLAG OF THAT SEGMENT (DELETE FROM THE SIDE FILE)
206
UPDATE THE TOTAL AMOUNT USED AND THE INDIVIDUALLY USED AMOUNT BY SUBTRACTION

FIG. 10


DATA WRITE PROCESSING FROM CACHE MEMORY TO DISK
301
RETRIEVE THE CACHE MANAGEMENT TABLE
302
MASTER DIRTY FLAG = 1 FOUND?
N
Y
303
SELECT SEGMENT OF MASTER DIRTY FLAG = 1 BY LRU METHOD ETC.
304
WRITE EXECUTE THE SEGMENT INTO DISK
305
RESET MASTER DIRTY FLAG (=0) OF THE SEGMENT UPDATE LRU INFORMATION